Abstract

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Supply logistics in construction companies and sustainable urban freight transport

The existing research gap in the area of supply logistics in construction companies was the motivation to undertake the research topie. The basis for the purpose of the study was to *develop a comprehensive model of supply logistics for construction companies, which would allow them to reduce their negative impact on the functioning ofcities.*

In order to achieve the main goal, the followings goals have been specified:

G1. Analysis and critical assessment of the current State of supply logistics in selected construction companies.

G2. Determining and assessing the negative impact of construction projects carried out by the surveyed construction companies on the functioning of cities.

Based on the goals above, the hypotheses were verified. The main hypothesis that was taken up in the dissertation is: *the use of decision trees in the management of supply logistics for the construction sector will reduce the negative impact of construction projects on the functioning of the city.*

In order to verify the main hypothesis, detailed hypotheses have been also specified:

H1. The effectiveness of supply management determines the reduction of the risk related to the timely implementation of construction projects.

H2. The proposed model of supply logistics will contribute to the improvement of the decision-making process in the field of logistics of construction projects carried out in the city.

For the purposes of implementing the adopted research objectives of the dissertation and verifying the hypotheses, the research covered construction companies operating in Szczecin, and the subject of the research were projects carried out by them. As part of the research, the current State of supply logistics in selected construction companies was analyzed and assessed, and the negative impact of construction projects carried out by the surveyed construction companies on the functioning ofcities was determined and assessed. Additionally, research was carried out using the Delphi method, which allowed for the development of a comprehensive model of supply logistics for construction companies, allowing for the reduction of their negative impact on the functioning of cities. The developed author's model was validated using the Petri nets in the HPSim software on the examples of 3 building structures implemented in Szczecin, which allowed for a positive verification of the main research hypothesis.

The work consists of five chapters. The first chapter presents considerations on the management of a modern company. The analyzes in this chapter were based on

literaturę research, which used both Polish and English-language literaturę on the subject.

The second chapter deals with the specificity of managing construction companies. The importance of participants in construction processes and project execution Systems for management processes was emphasized. The importance of logistics management for the entire construction activity was emphasized. The analyzes were based on studies of literaturę and legał acts, as well as the analysis of statistical data.

Chapter three presents the topie of procurement logistics in construction in the context of sustainable urban freight transport. The main challenges were identified and Solutions were analyzed to reduce the negative impact of its implementation. The supply was emphasized as the basis for the implementation of construction works, the related processes, types of supply, their advantages and disadvantages as well as existing problems were analyzed. The analyzes in this chapter were based on literaturę research, analysis of good practices applied in the world and projects in the field of sustainable urban freight transport and sustainable construction.

In the fourth chapter, the author presents and analyzes the results of the research using the Delphi method as well as structured and unstructured observations. There are presented dysfunctions in the functioning of modern cities identified during the research in the context of logistics of construction supplies, good practices applied in the world and the possibilities of their implementation.

The fifth chapter analyzes construction projects implemented in Szczecin and the companies implementing them. The results of surveys and direct interviews with selected enterprises were presented and interpreted. An original decision-making model of construction supply logistics was presented in the context of reducing the negative impact of the construction projects implemented in Szczecin. It was created on the basis of a decision tree that allows the selection of the type of supply optimal for the conditions in which the project is carried out. The model allows both to reduce the negative impact of the implemented construction project on the environment and makes it easier for enterprises to make decisions in this regard. It takes into account the difficulties related to the implementation of the selected type of supply for the enterprise (for example, in the case of a lack of financial resources for the creation of logistic bodies, another solution is sought). This chapter also presents the model validation using a Petri nets for three selected buildings in the HPSim software. Additionally, decision trees were presented to enable the decision to implement organizational Solutions to reduce the negative impact of the implementation of construction supplies on the environment.

Conclusions are presented at the end of the work.